



Oregon

John A. Kitzhaber, MD, Governor

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July 24, 2014

Also Sent Via E-mail

Mr. Robert J. Wyatt
NW Natural
220 N.W. Second Avenue
Portland, OR 97209

**Re: Resolution of Conditions for Preparing the Revised Human Health and Ecological Risk Assessment Report
NW Natural "Gasco Site"
Portland, Oregon
ECSI Nos. 84**

Dear Mr. Wyatt.

DEQ reviewed NW Natural's "Revised Proposed Resolutions to Key Conditions" dated June 24, 2014 (June 24th Proposal). The June 24th Proposal provides NW Natural's approach for resolving remaining conditions for finalizing the Gasco Site uplands human health and ecological risk assessment (HERA) report. DEQ's conditions for finalizing the HERA report are identified in our May 8, 2014 letter commenting on the Draft HERA Report¹.

After receiving our May 8th letter, NW Natural and DEQ participated in several follow-up meetings and discussions regarding any technical questions NW Natural had to address each of the conditions in DEQ's May 8th letter, followed by meetings to discuss NW Natural's position(s) on the conditions.

The primary purpose of this letter is to respond to each of the proposed resolutions in the June 24th Proposal, including acknowledging NW Natural's acceptance of DEQ's condition, providing additional clarification related to conditions, communicating our decisions on proposals, and describing the methods to be used for analyzing and presenting data in the Final HERA Report.

This letter finalizes the approach for resolving the conditions identified by NW Natural in the June 24th Proposal. Anchor QEA, LLC previously confirmed that DEQ provided the information needed for NW Natural to address our May 8th conditions for finalizing the HERA via an e-mail sent on June 26th. Based on this information, NW Natural should proceed with preparing the Revised HERA Report. Consistent with schedule information NW Natural provided in the June 24th Proposal, the Revised HERA Report should be submitted on or before November 21, 2014.

¹ Anchor QEA, LLC, 2013, "Human Health and Ecological Risk Assessment Report – NW Natural Gasco Site," October (received October 24, 2013 with remaining figures received December 3 and January 15, 2014), a report prepared for NW Natural.

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Condition #1, Implementation of Beneficial Use Determination of Alluvial WBZ

DEQ acknowledges NW Natural's decisions to: 1) withdraw the June 19th proposal to address the Alluvium water-bearing zone (WBZ) through implementation of institutional controls; and 2) not revise the Draft HERA Report by removing ingestion (i.e., drinking) as a route of exposure in the evaluation of human health risk associated with groundwater in the Alluvium WBZ. Regarding Item #1, during the June 19th meeting DEQ informed NW Natural it is more appropriate to assess institutional controls as a potential remedial alternative in the Gasco Site feasibility study (FS) rather than in the HERA.

Regarding NW Natural's decision to not remove ingestion as a route of exposure, consistent with our May 8th letter DEQ expects the human health risk associated with exposure to groundwater in the Alluvium WBZ that was evaluated and presented in the Draft HERA Report to then be included in the evaluation of cumulative risk in the Revised HERA Report.

The June 24th Proposal indicates that, "NWN appreciates DEQ's recognition that a less conservative exposure scenario may be appropriate...". DEQ acknowledges that human health exposure is unlikely from drinking groundwater in the Alluvium WBZ. For clarification, it is not currently known what the relative contribution of the ingestion pathway is to human health risk associated with exposure to groundwater in the Alluvium WBZ. In other words, it may be that the dermal contact and inhalation pathways account for most of the risk to human health associated with the Alluvium WBZ.

Condition #2, Evaluation of Groundwater Risk to In-Water Receptors

Regarding revising the text of the Draft HERA Report, DEQ acknowledges that based on the June 19th meeting, NW Natural will: 1) revise the narrative of the Revised HERA Report to describe and discuss the results of screening the Fill WBZ and Alluvium WBZ against aquatic life criteria; and 2) withdraw the proposal to include information from the Portland Harbor Baseline Risk Assessment in the Revised HERA Report.

For clarification and to avoid potential misunderstandings, DEQ's May 8th letter identifies additional groundwater chemical of potential concern (COPCs) based on data available for the Fill WBZ and Alluvium WBZ. In addition, DEQ's June 13, 2014 e-mail lists the pathways to be included in ecological cumulative risk calculations (see DEQ's reply to the "Comment 10 – Question"). DEQ requires the incorporation of COPCs into the assessment of groundwater cumulative risk consistent with the May 8th letter and attachments and the June 13th e-mail. Thus, where any of DEQ's conditions require data analyses for the Fill WBZ and/or Alluvium WBZ, including data for additional COPCs; the results should be fully incorporated into the revised narrative of the text and updated tables and figures in the Revised HERA Report. For example, one requirement of DEQ's "COI and Data Screening" condition involves NW Natural incorporating additional COPCs (i.e., vanadium, aluminum, carbon disulfide, iron, ammonia, barium, manganese, and isopropylbenzene) into the analysis of cumulative ecological risk by exposure to groundwater in the Fill WBZ and Alluvium WBZ. The Revised HERA Report should fully incorporate these and any other related results into the report narrative.

Condition #3, Addition of TPH Analysis to the Groundwater Monitoring Program

DEQ acknowledges NW Natural's agreement to add total petroleum hydrocarbons (TPH) to the groundwater monitoring program for the Gasco Site and Siltronic Corporation (Siltronic) Site beginning with the next sampling event. DEQ appreciates this addition.

Details for incorporating TPH into the groundwater monitoring program are described in our June 13th e-mail. The June 13th e-mail indicates that:

- TPH (NWTPH-Gx and NWTPH-Dx) should be collected from all monitoring wells used in the HERA, including the installations DEQ identified for incorporation into the Draft HERA Report; and
- TPH fractions should be analyzed for at all shoreline monitoring wells used in the HERA.

DEQ's June 13th e-mail also requests a proposal from NW Natural to identify monitoring wells in the groundwater source control performance monitoring program for the purpose of collecting representative TPH and TPH fractions data. Subsequent to DEQ's review and approval of NW Natural's proposal these wells should be sampled for TPH and TPH fractions.

To date DEQ has not received NW Natural's proposed list of monitoring wells. Consistent with the "integrated monitoring program" the next sampling event was originally to have been conducted in June 2014. DEQ currently understands that the June 2014 sampling event has been postponed in part because of HERA discussions, but also to accommodate the Phase 1-Step 5 test of the Alluvium WBZ hydraulic control and containment system.

DEQ does not agree with NW Natural's understanding from the June 19th meeting that, "...a primary reason DEQ is requesting this analysis is to verify the relationship of TPH to PAH groundwater risk at the site." For clarification, DEQ's position regarding TPH in groundwater is that it is an important COPC for the Gasco Site and Siltronic Site that should be fully evaluated along with other important groundwater COPCs.

Regarding NW Natural's request for information about how the TPH and TPH fractions data will be used, our May 8th letter and June 13th e-mail indicate that the TPH data will be used for purposes of:

- Comparison with groundwater pathway evaluations included in the HERA Report;
- Providing data for use in the Siltronic Site remedial investigation, including the HERA, and the feasibility studies (FS) for the Gasco and Siltronic sites; and
- Monitoring the effectiveness and performance of the Fill WBZ and Alluvium WBZ source control measures along with other groundwater contaminants and sampling parameters.

Our May 8th letter indicates that DEQ will not delay approval of the HERA while TPH and TPH fraction data are being collected. The letter further indicates that DEQ will accept a Revised HERA Report that addresses our May 8th conditions for purposes of moving the project forward into the FS subject to NW Natural: 1) acknowledging in the uncertainty section that lacking TPH data, the risk of exposure to human health and ecological receptors is underestimated for the groundwater pathways and

for cumulative site risk overall; and 2) adding TPH to the groundwater monitoring program for both the Gasco Site and the Siltronic Site (i.e., the “integrated monitoring program”). NW Natural’s June 24th Proposal agrees to add TPH to the groundwater monitoring program. DEQ anticipates the Revised HERA Report will address Item #1.

Condition #4, Evaluation of TPH Risk in Soil by Estimating TPH Concentrations from Total PAH Concentrations

Based on our review of NW Natural’s June 18th proposal, DEQ will require NW Natural to estimate TPH concentrations using the approach discussed in the May 8th letter (and this letter) for purposes of preparing the Revised HERA Report. DEQ sees some merit to NW Natural’s approach as it acknowledges and would describe in a semi-quantitative manner unacceptable risk from TPH in soil for each exposure area. However, NW Natural’s proposed method is limited compared to DEQ’s approach with respect to estimating TPH risk in soil across the site, with depth, and for informing the FS evaluation. What is also significant from DEQ’s perspective is that NW Natural’s approach does not make use of historical data available for the site. The main differences between NW Natural’s proposal and DEQ’s approach are summarized below.

- NW Natural’s proposal would rely on laboratory analytical data from one surface composite soil sample and one subsurface composite soil sample collected per the Data Gaps FSP² to estimate TPH concentrations for each exposure area. In contrast, DEQ’s approach uses this same analytical data along with available site soil analytical data for PAHs to estimate TPH concentrations within and across individual exposure areas and with depth. Thus, DEQ’s approach provides a more spatially robust and complete representation of potential TPH contamination at the Gasco Site.
- The range of TPH concentrations present within an individual exposure unit cannot be assessed using NW Natural’s proposal. DEQ’s approach provides the basis for preparing TPH soil iso-concentration maps that can be directly incorporated into the FS scoping and planning process.
- The set of TPH data derived from historical PAH measurements will provide information on the variability and distribution of TPH concentrations in an exposure area, enabling the calculation of UCLs and more complete representation of EPCs.

Consistent with the May 8th letter, DEQ’s approach is based on using composite data gaps soil sampling results and the proportions method to estimate TPH concentrations at historic soil sampling locations with PAH data. DEQ considers subsurface samples, which focused on MGP residuals, to be more representative of source material types released at the site. As indicated in our May 8th letter, DEQ found that the ratios of TPH to total PAHs in subsurface composite samples ranged from approximately 2 to 4, indicating that TPH concentrations are about 2 to 4 times higher than the concentration of total PAHs detected in MGP residuals. It is possible that these ratios may underestimate TPH concentrations in soil, but the approximation appears to be reasonable when compared to surface composite results. In general, ratios using surface composites were higher than those developed using subsurface soil samples. Most of the ratios based on surface composites ranged

² Anchor, QEA LLC, 2012, “Field Sampling Plan, TPH Data Gaps Sampling – NW Natural Gasco Site,” June, a document prepared for NW Natural.

from 3 to 7. The former spent oxide area exhibited the highest ratio of 21 using the surface composite result.

As indicated in the June 13th e-mail, DEQ will provide the details for integrating adjusted TPH concentrations into the HERA, including the list of samples; the estimated total TPH concentration for each sample point with supporting documentation; the site-specific RBC used to screen the data; and the source material HQs and exposure area HQs. DEQ will follow-up this letter with this information.

For NW Natural's information, DEQ's approach uses the steps below to estimate TPH concentrations at locations where PAH data are available but complete sets of TPH data are not. From a practical standpoint, the procedure will be applied to any soil sampling location where a complete TPH analysis is unavailable, such as any sampling location lacking both NWTPH-Gx and NWTPH-Dx data, or any location where only EPA Method 418.1 was used.

- Human health and ecological exposure areas will be divided into subareas based on MGP source material type.
- Historic sample locations (i.e., data points) will be identified within each subarea.
- Concentrations of TPH (as needed) will be calculated for each data point using the proportions method, available PAH data, and composite sampling results.
- Available PAH data will be multiplied by the following factors identified for each MGP source material type to estimate the total TPH concentration for each soil sample.
 - Former spent oxide area = 2.1
 - Former lampblack area = 4.6
 - Former tar settling pond = 2.9
 - Former Koppers land disposal area = 2.8
 - Former naphthalene plant area = 2.6
- TPH EPCs will be calculated using all available data, including the estimated TPH concentrations and complete TPH data (i.e., the sums of NWTPH-Gx and NWTPH-Dx results where available).
- Hazard quotients (HQs) for TPH will be calculated for each subarea using the ratio of the EPC to the appropriate MGP waste-type specific TPH risk-based concentration.
- The HQ for each subarea will be multiplied by a factor (less than 1) representing the subarea's fraction of the entire exposure area.
- An area-weighted HQ will be calculated for each exposure area by summing up the subarea HQs.
- NW Natural will incorporate the exposure area HQs into the Revised HERA Report.

DEQ appreciates NW Natural's estimates of TPH values, and acknowledges that it is unfortunate the previously agreed to method was unsuccessful in providing this information. We will be available for questions that NW Natural might have related to incorporating the information provided by DEQ into the Revised HERA Report.

5) Recalculation of Exposure Point Concentrations (EPCs) in HERA

Based on our review of the June 24th Proposal, DEQ will require NW Natural to recalculate EPCs for the reasons cited in, and consistent with our May 8th letter. The basis for DEQ's decision is provided

below.

DEQ understands from the June 24th Proposal that NW Natural believes recalculating exposure point concentrations (EPCs) as required by our "Calculation of Soil, Groundwater, and Area-Wide Exposure Point Concentrations" condition, "...will not change the overall conclusions of the risk assessment and is therefore not necessary for the completion of the HERA Report or its use to support development of the Feasibility Study." NW Natural's June 24th Proposal does not provide information to support this statement nor does it offer an alternative approach to resolve DEQ's condition. Furthermore, NW Natural does not question DEQ's conclusion that a significant number of EPCs calculated in the Draft HERA Report are underestimated by 20% to 30%.

NW Natural asserts that EPC calculations in the Draft HERA Report were completed consistent with DEQ's comments on the HERA Work Plan³ and with our Human Health Risk Assessment Guidance. DEQ's May 8th letter acknowledges that our comment on the risk assessment work plan may imply that the 95%-UCL should be used to represent the 90%-UCL whenever EPA determines that the 95%-UCL does not provide sufficient coverage. However, the comment also clearly indicates that, if based on data distributions ProUCL recommends using a 97.5% or 99% value to estimate the 95%-UCL then this information should be used in calculations of the 90%-UCL. The statement that a 95%-UCL may be needed to provide 90-percent coverage was intended by DEQ as an example, not as the only possibility. DEQ was not identifying exceptions to recommendations from ProUCL.

Regardless, the 90%-UCLs in the Draft HERA Report were to be calculated consistent with ProUCL guidance. NW Natural agreed to follow ProUCL recommendations for calculating EPCs. However, when ProUCL recommended that a 97.5% or 99%-UCL be used instead of the 95%-UCL to provide 95% coverage, NW Natural always selected the 95%-UCL to represent the 90%-UCL. In numerous cases where ProUCL recommended the use of the 99%-UCL, NW Natural did not follow the recommendations that a UCL higher than 97.5%-UCL was needed to provide appropriate coverage.

In summary, there are a large number of samples on the Gasco Site where the ProUCL recommendation for 95-percent coverage is to use the 99%-UCL. Following ProUCL recommendations has the potential to increase estimates of risk and potentially alter the outcome of the HERA. Based on this information and consistent with ProUCL recommendations, DEQ considers it important to use a higher UCL to provide 90-percent coverage and ensure the objectives of the HERA are met and that the HERA fully supports the FS.

Item #6, Use of Washington State Ecological Soil TPH Criteria

DEQ acknowledges NW Natural's agreement for the uncertainty section of the Revised HERA Report to include discussions regarding the uncertainty associated with not screening site soil TPH concentrations in the ecological risk assessment presented in the Draft HERA Report. DEQ considers TPH to be an important COPC for the ecological risk assessment of the Gasco Site. Consistent with

³ Anchor QEA, 2012, "Work Plan, Human Health and Ecological Risk Assessment, NW Natural Gasco Site," March (received March 22, 2012, supplemented May 29, 2012) a work plan prepared for NW Natural.

our May 8th letter, NW Natural will discuss the uncertainty in the context of State of Washington (Washington) TPH criteria. The TPH values designated by Washington are for ecological risk associated with petroleum fuel hydrocarbons. DEQ also acknowledges that NW Natural will discuss uncertainties associated with the methods used to develop the Washington criteria. Based on the Draft HERA Report, DEQ concluded that TPH concentrations at the Gasco Site exceed the Washington criteria. DEQ's conclusion is included in our May 8th letter. Exceedances of the Washington criteria by TPH at the site should be acknowledged and discussed in the uncertainty section of the Revised HERA Report.

NW Natural asks that DEQ provide a regulatory basis for our request to discuss MGP TPH data in terms of the Washington TPH criteria. This information is provided below:

- Oregon Revised Statutes 465.315(2)(a)(D) establishes requirements of risk protocol to identify appropriate sources of toxicity information;
- Oregon Administrative Rules (OAR) 340-122-0084(1)(c)(B) and -0084(1)(c)(C) further allows DEQ to utilize numerous sources of toxicity information in the ecological risk assessment; and
- OAR 340-122-0084(3)(d) recognizes DEQ's ability to use current information for purposes of ecological response analysis and -0084(3)(g) for including quantitative and qualitative analyses of uncertainty in the risk assessment.

Proposed Schedule

Based on our review of the June 24th Proposal, NW Natural's agreements, and DEQ decisions, NW Natural should prepare the Revised HERA Report consistent with our May 8th letter and this letter, including adding MGP residuals to selected figures.

As indicated above, the Revised HERA Report should be submitted on or before November 21, 2014. DEQ is available to discuss NW Natural's questions that come up during preparation of the report. DEQ considers it important to maintain regular communication while the Revised HERA Report is being prepared and recommends that NW Natural arrange telephone check-ins on a minimum two week basis for this purpose.

DEQ accepts NW Natural's proposal to prepare soil and groundwater iso-concentration maps subsequent to submitting the Revised HERA Report. Based on the June 24th Proposal, DEQ requires the figures to be submitted on or before December 22, 2014. For clarification, DEQ will require NW Natural to prepare the soil and groundwater figures consistent with our May 8th letter and June 13th e-mail.

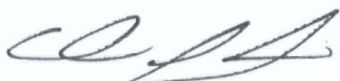
DEQ looks forward to receiving the Revised HERA Report. Given the status of the HERA, DEQ believes the scoping and planning process for the Gasco Site FS can be initiated and meetings should occur while the Revised HERA Report is being prepared. DEQ will look to arrange the initial meeting in the early to mid-September timeframe.

Robert Wyatt
NW Natural
July 24, 2014
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DEQ acknowledges and appreciates the challenging work NW Natural is doing on the Gasco and Siltronic sites. DEQ also acknowledges the contribution made to the progress of this work by the HERA for the Gasco Site.

Please feel free to contact me with questions regarding this letter.

Sincerely,



Dana Bayuk
Project Manager
Cleanup and Site Assessment Section

Attachment: June 24th Proposal

Cc: Patty Dost, Pearl Legal Group
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Taku Fuji, Anchor QEA, LLC
Carl Stivers, Anchor QEA LLC
Myron Burr, Siltronic Corporation
Alan Gladstone, Davis Rothwell Earle and Xochihua
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